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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/916,269	07/30/2001	Noriyuki Kaifu	35.C15635	8681

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EXAMINER	
WANG, GEORGE Y	
ART UNIT	PAPER NUMBER
2871	

DATE MAILED: 12/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/916,269	KAIFU ET AL.	
	Examiner	Art Unit	
	George Y. Wang	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 September 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 April 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *16*.
4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on September 2, 2003 has been entered.

Information Disclosure Statement

2. The information disclosure statement filed September 2, 2003 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-7 and 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admission of Prior Art (AAPA) in view of Spivey et al. (U.S. Patent No. 5,528,043, from hereinafter "Spivey") and Yabe et al. (U.S. Patent No. 4,803,550, from hereinafter "Yabe").

5. As to claims 1 and 18, AAPA discloses a radiation image sensing apparatus and method having and using an image sensing unit (fig. 9, ref. 102) and a control circuit (fig. 9, ref. 106) for stopping emission of radiation. However, AAPA does not specifically disclose an image sensing unit having the non-destructive reading capability, a drive circuit which drives the image sensing unit, and a differential circuit.

Spivey discloses an image sensing unit that has a non-destructive reading (col. 4, lines 3-10).

Yabe discloses a drive circuit (fig. 1, ref. 21) which drives the image sensing unit, and a differential circuit (fig. 8, ref. 96, 97) and a control circuit (fig. 1, ref. 15) for comparing radiation with a reference level (abstract).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated an image sensing unit, with all its aforementioned elements, for non-destructive reading as recited above since one would be motivated to provide even distribution of stored voltages across the sensing array proportional to the distribution of x-ray photons incident on the absorbing layer (Spivey, col. 2, lines 31-34). Circuitry in each pixel provides for the voltage on each pixel to be recorded via readout circuitry and permits the resetting of the pixel capacitors, which results in many advantages because of CMOS technology, such as better circuit performance, design flexibility, and unity in circuitry readout (Spivey, col. 2, lines 36-42). Furthermore, it would provide an image free from blurring, with adequate brightness with respect to a wide range of distance of observations (Yabe, col. 2, lines 23-35).

6. Regarding claims 2-7 and 16, AAPA and Yabe disclose a radiation image sensing apparatus and method as recited above, however, the reference fails to specifically disclose switch transistors, reading transistors, and reset transistors. Furthermore, the references fail to specifically teach an image sensing unit that has a pixel portion with a photoelectric conversion element connected to a control terminal of a reading transistor.

Spivey discloses an image sensing unit that has a non-destructive reading (col. 4, lines 3-10) with switch reading modes defined by switching transistors (fig. 3, ref. 56), a reading transistor (fig. 5, ref. 110), a reset transistor (fig. 5, ref. 26), and a pixel portion (fig. 1, ref. 9; fig. 5) with a photoelectric conversion element (fig. 3, ref. 10) connected to a control terminal of a reading transistor (fig. 3, ref. 41). Furthermore, Spivey discloses a load of constant current from transistor (col. 8, lines 14-15) connected to the main electrode terminal with voltage amplification of approximately 1 (col. 8, lines 17-22).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated an image sensing unit, with all its aforementioned elements, for non-destructive reading as recited above since one would be motivated to provide even distribution of stored voltages across the sensing array proportional to the distribution of x-ray photons incident on the absorbing layer (col. 2, lines 31-34). Circuitry in each pixel provides for the voltage on each pixel to be recorded via readout circuitry and permits the resetting of the pixel capacitors, which results in many advantages because of CMOS technology, such as better circuit performance, design flexibility, and unity in circuitry readout (col. 2, lines 36-42).

7. As per claims 17 and 19-21, AAPA and Spivey disclose a radiation image sensing apparatus and method as recited above, however, the references do not specifically disclose a control circuit that detects object information and changes reference level on the bases of the detected information through thinning-out read-out and addition.

Yabe discloses a control circuit that detects object information and changes reference level on the bases of the detected information (col. 12, line 52 – col. 13, line 2) through thinning-out read-out and addition (col. 19, lines 50-68).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a control circuit that detects object information and changes reference level on the bases of the detected information through thinning-out read-out and addition since one would be motivated to provide even distribution of stored voltages across the sensing array proportional to the distribution of x-ray photons incident on the absorbing layer (col. 12, line 52 – col. 13, line 2), which would ultimately provide an image free from blurring, with adequate brightness with respect to a wide range of distance of observations (col. 2, lines 23-35).

8. Claims 8-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA, Spivey, and Yabe in view of Brujins (U.S. Patent No. 5,778,044).

AAPA, Spivey, and Yabe disclose a radiation image sensing apparatus having an image sensing unit and a control circuit for stopping emission of radiation as recited above. However, the references fail to specifically disclose a control circuit having a pattern recognition circuit, detection circuit, and a generation circuit. Furthermore, the references do not specifically teach an addition and difference circuit that performs weighted additions and subtractions based on reference patterns, radiation amounts, reference values from pattern recognition circuit, and appropriate sensing times.

Brujins discloses an x-ray image pick-up apparatus with a control circuit (fig. 1, ref. 10) having a pattern recognition circuit (fig. 1, ref. 39), detection circuit (fig. 1, ref. 35), and a generation circuit (col. 5, lines 33-35). Furthermore, Brujins teaches an arithmetic circuit (fig. 1, ref. 11) that performs weighted additions and subtractions (fig. 3) based on reference patterns, radiation amounts, reference values from pattern recognition circuit, and appropriate sensing times.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated a control circuit having a pattern recognition circuit, detection circuit, a generation circuit, and an addition and difference circuit for performing weighted additions and subtractions based on reference patterns, radiation amounts, reference values from pattern recognition circuit, and appropriate sensing times since one would be motivated to derive and offset-corrected electronic image (col. 6, lines 22-29). When offset differences as well as gain differences are corrected, the corrected brightness values yield an image of high diagnostic quality (col. 6, lines 47-50). Notable disturbances of brightness values due to offset in electronic image signal as well as those due to vignetting are counteracted (col. 6, lines 50-56). The accuracy is even so high that, if the circumstances in which the x-ray images are picked up do not vary too much, a substantially disturbance-free composite image can be derived with a fixed set of correction values (col. 6, lines 64-68).

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Y. Wang whose telephone number is 703-305-7242. The examiner can normally be reached on M-F, 8 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on 703-305-3492. The fax phone number for the organization where this application or proceeding is assigned is 703-308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

gw
November 19, 2003

ROBERT H. KIM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800